

NON-PUBLIC?: N
ACCESSION #: 8811210116
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Braidwood 1 and 2 PAGE: 1 of 4

DOCKET NUMBER: 05000456

TITLE: Instrument failures on Unit 1 and Reactor Trip on Unit 2 from Lightning
Induced Voltage Transients
EVENT DATE: 10/17/88 LER #: 88-023-00 REPORT DATE: 11/10/88

OTHER FACILITIES INCLUDE: Braidwood 2 DOCKET NUMBER: 05000457

OPERATING MODE: 3 POWER LEVEL: 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(iv) and 50.73(a)(2)(vii)

LICENSEE CONTACT FOR THIS LER:
NAME: Paul Stanczak, Technical Staff Engineer TELEPHONE: 815-458-2801

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: JB COMPONENT: PDT MANUFACTURER: 1204
CAUSE: SYSTEM: AB COMPONENT: PT MANUFACTURER: 1204
REPORTABLE TO NPRDS: YES
REPORTABLE TP NPRDS: YES

CAUSE: SYSTEM: AB COMPONENT: PDT MANUFACTURER: 1204
REPORTABLE TO NPRDS: YES

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

A severe lightning storm occurred at the plant site. Unit 1 was shutdown, At 1542 on October 17, 1988 various Unit 1 indications revealed erratic behavior and the Over Pressure Delta Temperature (OP DELTA T) and Over Temperature Delta Temperature (OT DELTA T) coincidence was met for a reactor trip. On Unit 2 a Reactor Trip and a Lock up of the computer memory for the Reactor Vessel Level Indicating System (RVLIS) occurred. The root cause is a voltage transient into the Station Ground System from Lightning strikes which actuated the overvoltage protection for the RD power supplies, for both units, subsequently resulting in th Unit 2 Reactor Trip. RVLIS failed from an overvoltage condition. On Unit 1, the instrument loop transmitters were replaced and all power supplies were

reset. There were no equipment failures with the OP DELTA T and OT DELTA T instrument channels. Investigation revealed the station grounding scheme is adequate; however, the vent stack grounding is incomplete. This did not contribute to the Unit 2 trip. Additional grounding and additional protective measures for the RD system are being investigated. There were no previous occurrences.

END OF ABSTRACT

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A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: Braidwood 1; Event Date: October 17, 1988; Event Time: 1542;

Mode: 3 - Hot Standby; Rx Power: 0%;

RCS AB! Temperature/Pressure: N.O.T./N.O.P.

Unit: Braidwood 2; Event Date: October 17, 1988; Event Time: 1542;

Mode: 1 - Power Operation; Rx Power: 88%;

RCS AB! Temperature/Pressure: N.O.T./N.O.P.

B. DESCRIPTION OF EVENT:

Unit 1

There were no systems or components inoperable at the beginning of the event that contributed to the severity of the event. The reactor trip breakers were open for a scheduled Rod Drive System (RD) AA! test. A severe lightning storm with observed strikes was being experienced at the plant site.

At 1542 on October 17, 1988 the Control Room Annunciation and indication revealed erratic behavior from the following instrument channel level (LT), pressure (PT), and flow transmitter (FT) loops:

1LT-0557, Steam Generator 2B Narrow Range Level JB! had failed high.
1PT-0456, Pressurizer Pressure AB! had failed high.
1FT-0445, Reactor Coolant Flow AB! 1D had failed low.

At the same time Control Room Annunciation indicated that the Over Pressure Delta Temperature (OP DELTA T) and Over Temperature Delta Temperature (OT DELTA T) coincidence was met for a reactor trip.

Further investigation revealed that ten out of ten +24 volt power supply overvoltage protection circuits had actuated in the RD power cabinets.

There were no manual or automatic safety system actuations required. Operator immediate corrective actions verified that the redundant transmitter loops were operative and plant conditions were stable.

This event is being reported pursuant to 10CFR50.73(a)(2)(vii)(A) - any event where a single cause or condition caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a system designed to shutdown the reactor and maintain it in a safe shutdown condition.

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UNIT 2

There were no systems or components inoperable at the beginning of the event that contributed to the severity of the event. A severe lightning storm with observed strikes was being experienced at the plant site.

At 1542 on October 17, 1988, six out of ten +24 volt power supply overvoltage protection circuits actuated in the Rod Drive (RD) AA! power cabinets. This actuation resulted in a loss of control power to the rod drive system and allowed the rods to fall into the core. The falling of control rods actuated the Nuclear Instrument System (NIS) Power Range Flux Ration High Reactor Trip. Control Room annunciation and all safety system response was proper.

In addition a loss of indication from the Reactor Vessel Level Indicating System (RVLIS) was experienced. Operator actions insured automatic shutdown and completed plant stabilization at 1700.

The appropriate NRC notification via the ENS phone system was made at 1937 pursuant to 10CFR50.73(b)(2)(ii).

This event is being reported pursuant to 10CFR50.73(a)(2)(iv) - any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

The event for Unit 1 and Unit 2 were combined into this one report per guidance from Paul Bobe - Office for Analysis and Evaluation of Operational Data (AEOD) as a result of telephone conversation at 1212 CST on November 7, 1988.

C. CAUSE OF EVENT:

The root cause of this event was lightning induced voltage transients into the Station Ground System. Lightning is believed to have struck in the area of the Unit 1 and Unit 2 Containment. This caused a sudden voltage surge in the RD power supplies which actuated the overvoltage protection in the RD power supplies.

On Unit 2, RVLIS failed from an overvoltage condition that caused its computer memory to lock up. Also, a lightning induced failure of Train B of the Core Exit Thermocouple System (CETC) (IM) was believed to have occurred. However, this has been found to be incorrect as operation of the CETC was satisfactory all along.

D. SAFETY ANALYSIS:

This event had no effect on the safety of the plant or the public.

Unit 1 was shutdown, hence, no safety system actuations were required. Had the Unit been operating a reactor trip would have occurred. The three failed transmitters would not have affected plant operations as all redundant channels operated normally.

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On Unit 2, all safety systems operated as designed. Under the worst case conditions with the plant at 100% power, plant response would have been the same.

E. CORRECTIVE ACTIONS:

On Unit 1, the three instrument loop transmitters were found to have failed and were replaced. Loop calibrations were performed. The transmitters were inspected for component failures and their cable grounding was inspected to verify installation to the current design. The OP DELTA T and OT DELTA T instrument channels were found to have recorded the sudden fluctuations due to the voltage surge; however, no equipment failures were encountered.

The RD power supplies were inspected with no equipment or component failures other than a single blown fuse on the Unit 1 power supplies. The fuse was replaced and all power supplies were reset.

An investigation into the station grounding scheme by Station Field Engineering and the Architect Engineer has concluded that the design is adequate. During the investigation it was observed that the vent stack grounding system is incomplete.

However this condition was not considered as a contributor to the trip on Unit 2.

Completion of the vent stack grounding is being tracked by work request 20AT315. Additional grounding and methods to make it more efficient, as well as additional protective measures for the RD system are being investigated. These issues will be tracked to completion by Action Item 456-200-88-24001.

F. PREVIOUS OCCURRENCES:

None

G. COMPONENT FAILURE DATA:

Manufacturer Nomenclature Model Number MFG Part Number
Barton Differential Pressure Transmitter 764 NA
Barton Differential Pressure Transmitter 752 NA
Barton Pressure Transmitter 763 NA

ATTACHMENT 1 TO ANO 8811210116 PAGE 1 OF 1

Commonwealth Edison
Braidwood Nuclear Power Station
Route 1, Box 84
Braceville, Illinois 60407
Telephone 815/458-2801

November 15, 1988
BW/88-1434

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(iv) and 10CFR50.73(a)(2)(vii)(A) which require a 30 day written report.

This report is number 88-023-00; Docket No. 50-456.

Very truly yours,

R. E. Querio
Station Manager
Braidwood Nuclear Station REQ/AJS/jab
(7126z)

Enclosure: Licensee Event Report No. 88-023-00

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Record Center
CECo Distribution List

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